PTO 09-4900

CC=WO
DATE=20010816
KIND=A1
PN=01058279

WHIPPED CREAM
[Hoippu Sumi Kurimu]

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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. MAY 2009
TRANSLATED BY Schreiber Translations, Inc.

PUBLICATION COUNTRY	(10):	Japan
DOCUMENT NUMBER	(11):	01058279
DOCUMENT KIND	(12):	A1
PUBLICATION DATE	(43):	20010816
APPLICATION NUMBER	(21):	0100856
APPLICATION DATE	(22):	20010207
INTERNATIONAL CLASSIFICATION	(51):	A 23 L 1/19 A 23 C 13/00
PRIORITY COUNTRY	(33):	
PRIORITY NUMBER	(31):	
PRIORITY DATE	(32):	
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DESIGNATED CONTRACTING STATES	(81):	CN, US
TITLE	(54):	WHIPPED CREAM
FOREIGN TITLE	[54A]:	Hoippu Sumi Kurimu

Specification

Whipped Cream

(Technical field)

The present invention pertains to a whipped cream that can be refrigerated and preserved over a long term.

(Prior art)

Whipped creams are circulated in a liquid state. Unlike creams that are used by whipping when they are in use, labor and time for whipping are not required in the whipped creams, and its handling is simple.

However, since the whipped cream became unstable with time, the decrease of the overrun and the degradation of the mechanical resistance were apt to be caused, and as described in Japanese Kokai Patent Application No. Sho 60[1985]-87750, its freeze-preservation was required to preserve the whipped cream with high overrun.

In addition, in Japanese Kokai Patent Application No. Hei 6[1994]-225720, a foaming oil drop in water type emulsified composition that can be refrigerated and preserved over a long term after whipping is presented.

However, though the product described in Japanese Kokai Patent Application No. Sho 60[1985]-87750 was a high-

overrun product, it had to be frozen, and time for thawing was required.

Moreover, the composition described in Japanese Kokai Patent Application No. Hei 6[1994]-225720 could be refrigerated and preserved over a long term, however its overrun was low.

Therefore, the purpose of the present invention is to provide a whipped cream that has high overrun and can be refrigerated and preserved over a long term.

(Presentation of the invention)

In order to achieve the above-mentioned purpose, the present invention provides a whipped cream (hereinafter, also called a first whipped cream) characterized by the fact that fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist.

In addition, in order to achieve the above-mentioned purpose, the present invention provides a whipped cream

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(hereinafter, also called a second whipped cream) characterized by the fact that fatty spherical particles with a particle diameter of 0.1 μm or smaller exist at 10% or more.

Moreover, in order to achieve the above-mentioned purpose, the present invention provides a whipped cream

(hereinafter, also called a third whipped cream) characterized by the fact that when the particle size distribution of fatty particle particles is measured by the following "method for measuring the particle size distribution," 20 vol% or more of said fatty spherical particles is a particle diameter of 0.4 μm or smaller.

<Method for measuring the particle size distribution>

After the whipped cream is dispersed into ion exchange water and undergoes an ultrasonic treatment, it is measured by a Shimadzu laser diffraction type particle size distribution measurer (SALD-1100, made by Shimadzu Corporation).

(Brief explanation of the invention)

Figure 1 is an electron micrograph showing the structure of fatty spherical particles of a whipped oil in water type cream of Application Example 2 of the present invention.

(Preferred embodiment of the invention)

Next, the whipped cream of the present invention will be explained in detail.

First, a first whipped cream will be explained.

"Fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist" in the first whipped cream means that the content of fatty spherical

particles with a particle diameter of 1 μm or greater is 1% or less, preferably 0.5% or less, and more preferably 0.2% or less. Here, "%" is the percentage of the number of fatty spherical particles with a particle diameter of 1 μm or greater to the total number of fatty spherical particles.

In the present invention, the particle diameter of the above-mentioned fatty spherical particles and the number are measured by a device that can measure the particle diameter of the fatty spherical particles and the number. As such a device, for example, a Shimadzu laser diffraction type particle size distribution measurer (SALD-2100, made by Shimadzu Corporation) may be used.

In case the Shimadzu laser diffraction type particle size distribution measurer (SALD-2100, made by Shimadzu Corporation) is used, for example, a whipped cream is dispersed into ion exchange water, subjected to an

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ultrasonic treatment for 60 sec in an ultrasonic tank attached to the above-mentioned measurer, and measured under the condition of a refractive index of 1.60-0.20i by the above-mentioned measurer, so that the particle diameter of the fatty spherical particles and the number can be obtained.

Next, a second whipped cream will be explained. In the second whipped cream, fatty spherical particles with a particle diameter of 0.1 μm or smaller exist at 10% or more, preferably 20% or more, and more preferably 30% or more. Here, "%" is the percentage of the number of fatty spherical particles with a particle diameter of 0.1 μm or smaller to the total number of fatty spherical particles. The particle diameter of these fatty spherical particles and the number are measured similarly to the case of the above-mentioned first whipped cream.

In the first and second whipped creams, preferably, the fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist, and the fatty spherical particles with a particle diameter of 0.1 μm or smaller exist at 10% or more.

In addition, in the first and second whipped creams, it is preferable for the fatty spherical particles with a particle diameter of 1 μm or greater not to substantially exist at a foam interface. "The fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist at a foam interface" means that the fatty spherical particles with a particle diameter of 1 μm or greater do not exist at a foam interface when they are observed by an electron microscope.

Next, a third whipped cream will be explained.

In the third whipped cream, when the particle size distribution of fatty particle particles is measured by the above-mentioned "method for measuring the particle size distribution," fatty spherical particles with a particle diameter of 0.4 μm or smaller are included at 20 vol% or more, preferably 25 vol% or more, and more preferably 30 vol% or more in the total fatty spherical particles.

In addition, in the third whipped cream, the fatty spherical particles with a particle diameter of 0.3 μm or smaller are included at preferably 10 vol% or more, more preferably 15 vol% or more, and further preferably 20 vol% or more in the total fatty spherical particles. Moreover, the fatty spherical particles with a particle diameter of 0.2 μm or smaller are included at preferably 5 vol% or more, more preferably 8 vol% or more, and further preferably 12 vol% or more in the total fatty spherical particles.

Here, the particle size distribution in the present invention is measured as follows.

After the whipped cream is dispersed into ion exchange water and undergoes an ultrasonic treatment, it is measured by a Shimadzu laser diffraction type particle size distribution measurer (SALD-1100, made by Shimadzu

Corporation).

In this case, for example, a whipped cream dispersed into ion exchange water undergoes to an ultrasonic treatment for 60 sec in an ultrasonic tank (a transmission frequency of 47 kHz, 35 W) attached to the above-mentioned Shimadzu laser diffraction type particle size distribution measurer, and the particle size is measured under the condition of a refractive index of 1.60-0.20i by the above-mentioned Shimadzu laser diffraction type particle size distribution measurer.

Oils and fats constituting an oil phase part of the whipped cream of the present invention (the whipped cream of the present invention indicates the first, second, and third whipped creams) are not particularly limited. For example, there are various kinds of plant oils and fats and animal oils and fats such as palm oil, palm kernel oil, coconut oil, corn oil, cottonseed oil, soybean oil, rape seed oil, rice oil, sunflower oil, beef tallow, cream, lard, cacao butter, fish oil, and whale oil and processed oils and fats in which these plant and animals oils and fats undergo one or two or more treatments that are selected from hydrogenation, fractionation, and transesterification. Among these oils and fats, a palm

kernel olein-cured oil is preferable. These oils and fats can be used alone or can also be used in combination of two kinds or more.

The amount of mixture of the above-mentioned oils and fats is preferably 10-50 wt%, more preferably 20-40 wt%, and further preferably 25-35 wt% in the whipped cream of the present invention.

In addition, it is preferable for the water phase part of the whipped cream of the present invention to include proteins and saccharides

The above-mentioned proteins are not particularly limited. For example, whey proteins such as α-lactoalbumin, β-lactoalbumin, and serum albumin, egg proteins such as casein, milk protein, low-density lipoprotein, high-density lipoproptein, phosvitin, livetin, phosphorus protein, ovoalbumin, corn albumin, and ovomucoid, wheat proteins such as gliadin, glutenin, prolamin, and glutelin, and other animal and plant proteins are mentioned. These proteins may be added as one kind or two kinds or more of proteins or in a food material shape containing one kind or two kinds or more of proteins in accordance with the purposes.

The amount of mixture of the above-mentioned proteins

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is preferably 0.05-10 wt%, more preferably 0.1-6 wt% in the whipped cream of the present invention.

The above-mentioned saccharides are not particularly limited. For example, sugars such as glucose, fructose, sucrose, maltose, enzyme-saccharified thick malt syrup, lactose, reducing starch-saccharified product, isomerized liquid sugar, sucrose-coupled thick malt syrup, oligosaccharide, reducing sugar polydextrose, sorbitol, reducing lactose, trehalose, xylose, xylitol, maltitol, erythritol, mannitol, fructo-oligosaccharide, soybean oligosaccharide, galacto-oligosaccharide, lacto-fructo-oligosaccharide, raffinose, lactulose, palatinose oligosaccharide, stevia, and aspartame are mentioned. Among these saccharides, sugar alcohols such as reducing starch-saccharified product, reducing lactose, sorbitol, xylitol, maltitol, erythritol, and mannitol are preferably used. These saccharides can be used alone or can also be used in combination of two kinds or more.

The amount of mixture of the above-mentioned saccharides is preferably 10-70 wt%, more preferably 25-60 wt% in the whipped cream of the present invention.

In case substances containing water such as milk and liquid sugar are used as the above-mentioned proteins or the above-mentioned saccharides, it is not necessary to mix

water with the water phase part of the whipped cream of the present invention. In case water is mixed, its amount is preferably 0-50 wt%, more preferably 5-40 wt%, and further preferably 10-40 wt%.

In the whipped cream of the present invention, if necessary, an emulsifier and a stabilizer can be mixed in the oil phase part and/or the water phase part.

The above-mentioned emulsifier is not particularly limited. For example, lecithin, glycerin fatty acid ester, glycerin fatty ester acetate, glycerin fatty ester lactate, glycerin fatty ester succinate, glycerin fatty ester diacetyltartrate, sorbitan fatty acid ester, sucrose fatty acid ester, sucrose isobutyric ester acetate, polyglycerin fatty acid ester, polyglycerin condensed ricinoleic acid ester, propylene glycol fatty acid ester, calcium stearoyllactate, sodium stearoyllactate, polyoxyethylene sorbitan monostearate, polyoxyethylene sorbitan monoglyceride, etc., are mentioned. These emulsifiers can be used alone or can also be used in combination of two kinds or more.

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The amount of mixture of the above-mentioned emulsifiers is preferably 0-5 wt%, more preferably 0.15-3 wt% in the whipped cream of the present invention.

As the above-mentioned stabilizer, stabilizers such as phosphate (hexametaphosphoric acid, secondary phosphoric acid, and primary phosphoric acid), guar gum, xanthan gum, tamarind gum, carrageenan, alginate, furcellaran, locust-bean gum, pectin, gadolan, starch, chemically modified starch, crystal cellulose, gelatin, dextrin, agar, dextran, and propylene glycol ester alginate are mentioned. These stabilizers can be used alone or can also be used in combination of two kinds or more. Especially in the whipped cream of the present invention, xanthan gum and pectin are preferably used in combination among the above-mentioned stabilizers, and the weight ratio of the combination is preferably xanthan gum:pectin = 2:8-8:2. In addition, in case pectin is used, HM pectin (high-methoxyl pectin) is preferably used. Moreover, said HM pectin may have a DE value (the ratio (the degree of esterification) of galacturonic acid existing as methyl ester in the galacturonic acid constituting the pectin molecules) of preferably 50% or more, more preferably 60% or more, and most preferably 70% or more.

The amount of mixture of the above-mentioned stabilizers is preferably 0-5 wt%, more preferably 0.01-1 wt% in the whipped cream of the present invention.

Furthermore, flavoring components such as juice, jam, milk product, egg product, cacao and cacao product, coffee and coffee product, melon paste, and nut processed product, seasonings, spices, colorants, preservatives, antioxidants, pH adjustors, etc., can also be mixed in the whipped cream of the present invention.

Next, a preferable method for manufacturing the whipped cream of the present invention will be explained.

First, a water phase part containing water and other substances and an oil phase part containing oil and fat and other substances are respectively, separately prepared, and said water phase part and said oil phase part are mixed and emulsified to obtain an oil in water type emulsified composition.

The oil in water type emulsified composition obtained may also be homogenized in a range of pressure of 0-1,000 kg/cm^2 by a homogenizer such as valve type homogenizer,

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homomixer, and colloidal mill, if necessary. In addition, if necessary, an UHT·HTST·low-temperature disinfection using a direct heating method such as injection type and infusion type or an indirect heating method such as plate type, tubular type, and scraping type, a heating sterilization or heating disinfection treatment such as

batch type, retort, and microwave heating may also be applied, or heating may also be carried out by a heating cooking such as direct fire. Moreover, after heating, if necessary, the homogenization may also reapplied. Furthermore, a cooling operation such as rapid cooling and slow cooling may also be applied.

Next, the above-mentioned oil in water type emulsified composition is whipped by a vertical mixer or continuous whipping machine, so that a whipped cream is prepared.

The overrun of the whipped cream obtained is preferably 150 or more, more preferably 180-350, and further preferably 210-300. The overrun is a value obtained by the following expression.

((A - B)/B) x 100

However, A represents the weight of the cream with a fixed volume, and B represents the weight of the cream after whipping with a fixed volume.

The whipped cream of the present invention obtained in this manner is filled in a container and preserved in a refrigerated state (0-15°C). In addition, the whipped cream of the present invention can also be preserved in a frozen state (-18°C or lower).

Next, the present invention will be explained in further detail by application examples, however the present

invention is not limited to the following application examples.

<Application Examples 1-4> Application examples of first and second whipped creams:

Oil phase parts and water phase parts with compositions shown in the following Table 1 were respectively prepared, and said water phase parts and said oil phase parts were mixed and emulsified. They were then homogenized by a homogenizer (1,000 kg/cm^2), sterilized by a scraping type heat exchanger, and cooled down to 10°C to obtain oil in water type emulsified solutions. Next, these oil in water type emulsified solutions were whipped by a continuous whipper (2,000 rpm) to obtain whipped oil in water type creams, respectively.

The evaluation of the overrun and the mechanical resistance of the oil in water type whipped creams obtained, the particle size distribution of fatty spherical particles, and the existence of fatty spherical particles

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of 1 μm or greater at a foam interface through the observation with an electron microscope were shown in the following Table 1. In addition, for the oil in water type whipped creams of Application Examples 1 and 4, their water separation state was also evaluated, and the results were

shown in the following Table 1. Moreover, an electron micrograph showing the structure of the fatty spherical particles of the oil in water type whipped cream of Application Example 2.

The particle size distribution of the fatty spherical particles was measured as follows.

The whipped creams dispersed into ion exchange water underwent an ultrasonic treatment for 60 sec in an ultrasonic tank attached to a Shimadzu laser diffraction type particle size distribution measurer (SALD-2100, made by Shimadzu Corporation), and their particle size was measured under the condition of a refractive index of 1.60-0.20i by the above-mentioned Shimadzu laser diffraction type particle size distribution measurer.

In addition, a charger Cream Presser K-3 type (made by Koyo Machine Works K.K., using a nozzle of 5 mmØ, 30 rpm) was used in the evaluation of their mechanical resistance, and when the change in the specific gravity before and after passing through the charger was within 10% without a stop of charging, it was evaluated that the mechanical resistance was good.

Moreover, the oil in water type whipped creams of Application Examples 2 and 3 were refrigerated (5°C) and preserved, and after 10 days and 60 days, the overrun and

the mechanical resistance were evaluated. The results were shown in the following Table 1. The oil in water type whipped creams of Application Examples 1 and 4 were refrigerated (5°C) and preserved, and after 10 days, 60 days, and 120 days, their overrun and mechanical resistance were evaluated. The results were shown in the following Table 1.

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(Table 1)

		配合量（重量%）			
		実施例1	実施例2	実施例3	実施例4
油相部	パーム核オレイン硬化油（35℃）	28.0	31.0	30.0	28.0
	蒸留型モノグリセライド	0.5	0.7	—	0.5
	有機酸モノグリセライド	—	—	0.5	—
	レシチン	0.2	0.1	0.2	0.2
	ショ糖脂肪酸エステル	0.5	0.5	0.5	0.5
	カロテン	—	0.01	—	—
水相部	カゼインナトリウム	2.5	3.0	2.5	2.5
	ソルビトール	43.0	41.0	43.0	43.0
	水飴	7.6	7.6	7.6	7.6
	水	17.7	15.99	14.7	17.6
	牛乳	—	—	1.0	—
	キサンタンガム	—	—	—	0.05
	HMペクチン（DE値72%）	—	—	—	0.05
	香料	—	0.1	—	—
冷イップ後	脂肪球粒子の粒度分布（重量%） 1μm以上	0	0.1	0.1	0.1
	脂肪球粒子の粒度分布（重量%） 0.1μm以下	30	25	28	28
	オーバーラン	230	230	240	240
	機械耐性	良好	良好	良好	良好
	離水状態	—			—
10日後	オーバーラン	230	230	235	235
	機械耐性	良好	良好	良好	良好
	離水状態	—			—
90日後	オーバーラン	225	225	235	235
	機械耐性	良好	良好	良好	良好
	離水状態	—			—
120日後	オーバーラン	225			230
	機械耐性	良好			良好
	離水状態	+			±
電子顕微鏡観察による気泡界面上の1μm以上の脂肪球粒子の有無		無	無	無	無

離水状態　　+：離水有り　　±：やや離水有り　　—：離水無し

[1st row from left]
1. Amount of mixture (wt%)
[2nd row from left]
2. Application Example 1
3. Application Example 2
4. Application Example 3
5. Application Example 4
[1st column from 3rd row and down]
6. Oil phase part
7. Water phase part
8. After whipping
9. After 10 days
10. After 60 days
11. After 120 days
[2nd column from 3rd row and down]
12. Palm kernel olein-cured oil (35°C)
13. Fatty acid monoglyceride
14. Organic acid monoglyceride
15. Lecithin
16. Sucrose fatty acid ester
17. Carotene
18. Casein sodium
19. Sorbitol
20. Thick malt syrup
21. Water
22. Milk
23. Xanthan gum
24. HM pectin (a DE value of 72%)
25. Spices
26. Particle size distribution of fatty spherical particles (number of particles, %); 1 μm or greater; 0.1 μm or smaller
27. Overrun
28. Mechanical resistance
29. Water separation state
30. Overrun
31. Mechanical resistance
32. Water separation state
33. Overrun
34. Mechanical resistance
35. Water separation state
36. Overrun
37. Mechanical resistance
38. Water separation state

[20th row from 3rd column]
39. Good
40. Good
41. Good
42. Good
[23rd row from 3rd column]
43. Good
44. Good
45. Good
46. Good
[26th row from 3rd column]
47. Good
48. Good
49. Good
50. Good
[28th row from 3rd column]
51. Good
52. Good
[last row from left]

53. Existence of fatty spherical particles of 1 μm or greater at a foam interface through the observation with an electron microscope

54. None

55. None

56. None

57. None

Water separation state: + Existence of water separation, ± Existence of slight water separation, and - No water separation

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As seen from the above-mentioned Table 1, even if the first and second whipped creams of the present invention

are refrigerated and preserved for 60 days, the decrease of the overrun is little seen, and the mechanical resistance is good.

<Application Example 5> Application example of third whipped cream:

An oil phase part and a water phase part with compositions shown in the following Table 2 were respectively prepared, and said water phase part and said oil phase part were mixed and emulsified. It was then homogenized by a homogenizer (1,000 kg/cm^2), sterilized by a scraping type heat exchanger, and cooled down to 10°C to obtain an oil in water type emulsified solution. Next, the oil in water type emulsified solution was whipped by a continuous whipper to obtain a whipped oil in water type cream.

The evaluation of the overrun and the mechanical resistance of the oil in water type whipped cream obtained and the particle size distribution of fatty spherical particles were shown in the following Table 2.

The particle size distribution of the fatty spherical particles was measured as follows.

The whipped cream dispersed into ion exchange water underwent an ultrasonic treatment for 60 sec in an ultrasonic tank attached to a Shimadzu laser diffraction

type particle size distribution measurer (SALD-1100, made by Shimadzu Corporation), and its particle size was measured under the condition of a refractive index of 1.60-0.20i by the above-mentioned Shimadzu laser diffraction type particle size distribution measurer.

In addition, its mechanical resistance was evaluated similarly to Application Example 1.

Moreover, the above-mentioned oil in water type whipped cream was refrigerated (5°C) and preserved, and after 10 days and 60 days, its overrun and mechanical resistance were evaluated. The results were also shown in the following Table 2.

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(Table 2)

			配合量（重量%）
			実施例5
油脂相	パーム核ポリオレイン菜種油（35℃）		30
	脂肪酸モノグリセライド		0.5
	レシチン		0.1
	ショ糖脂肪酸エステル		0.5
水相	カゼインナトリウム		2.5
	ソルビトール		4.2
	水飴		7.0
	水		18.3
ホイップ後	脂肪球の粒径分布（重量%）	0.2μm以下	16
		0.3μm以下	38
		0.4μm以下	40
	オーバーラン		330
	機械耐性		良好
10日後	オーバーラン		330
	機械耐性		良好
60日後	オーバーラン		325
	機械耐性		良好

[1st row from left]

1. Amount of mixture (wt%)

[2nd row from left]

2. Application Example 5

[1st column from 3rd row and down]

3. Oil phase part

4. Water phase part

5. After whipping

6. After 10 days

7. After 60 days

[2nd column from 3rd row and down]

8. Palm kernel olein-cured oil (35°C)

9. Fatty acid monoglyceride

10. Lecithin

11. Sucrose fatty acid ester

12. Casein sodium

13. Sorbitol

14. Thick malt syrup

15. Water

16. Particle size distribution of fatty spherical particles (vol%); 0.2 μm or smaller; 0.3 μm or smaller; 0.4 μm or smaller

17. Overrun

18. Mechanical resistance

19. Overrun

20. Mechanical resistance

21. Overrun

22. Mechanical resistance

[15th row from 3rd column]

23. Good

[17th row from 3rd column]

24. Good

[19th row from 3rd column]

25. Good

As seen from the above-mentioned Table 2, even if the third whipped cream of the present invention is refrigerated and preserved for 60 days, the decrease of the overrun is little seen, and the mechanical resistance is good.

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<Application Examples 6-9> Application examples of third whipped cream:

Oil phase parts and water phase parts with compositions shown in the following Tables 3 and 4 were respectively prepared, and oil in water type emulsified solutions were respectively obtained by a method similar to that of Application Example 5.

The evaluation of the overrun and the mechanical resistance of the oil in water type whipped creams obtained and the particle size distribution of fatty spherical particles were shown in the following Tables 3 and 4. In addition, for the oil in water type whipped creams of Application Examples 8 and 9, the water separation state was also evaluated, and the results were shown in the following Table 4.

Moreover, the particle size distribution and the mechanical resistance of the fatty spherical particles were evaluated by a method similar to that of Application Example 5.

Furthermore, the oil in water type whipped creams of Application Examples 6 and 7 were refrigerated (5°C) and preserved, and after 10 days, 60 days, and 120 days, their overrun and mechanical resistance were evaluated. The results were shown in the following Table 3. The oil in water type whipped creams of Application Examples 8 and 9 were refrigerated (5°C) and preserved, and after 10 days, 60 days, and 120 days, their overrun and mechanical resistance were evaluated, and their water separation state was evaluated. The results were shown in the following Table 4.

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(Table 3)

			配合量 (重量%)	
			実施例6	実施例7
油相部	パーム核オレイン硬化油 (35℃)		31.0	29.0
	脂肪酸モノグリセライド		0.7	—
	有機酸モノグリセライド		—	0.7
	レシチン		0.1	0.1
	ショ糖脂肪酸エステル		0.5	0.6
水相部	カゼインナトリウム		2.5	3.0
	ソルビトール		42.0	35.0
	水飴		7.6	14.5
	水		15.0	16.4
	イチゴ濃縮果汁		0.5	—
	コーヒー(粉末)		—	0.5
	香料		0.1	0.2
ホイップ後	脂肪球粒子の粒度分布 (容積%)	0.2μm以下	15	15
		0.3μm以下	39	27
		0.4μm以下	41	38
	オーバーラン		245	240
	機械耐性		良好	良好
10日後	オーバーラン		240	235
	機械耐性		良好	良好
20日後	オーバーラン		235	230
	機械耐性		良好	良好
30日後	オーバーラン		235	230
	機械耐性		良好	良好

[1st row from left]

1. Amount of mixture (wt%)

[2nd row from left]

2. Application Example 6

3. Application Example 7

[1st column from 3rd row and down]
4. Oil phase part
5. Water phase part
6. After whipping
7. After 10 days
8. After 60 days
9. After 120 days
[2nd column from 3rd row and down]
10. Palm kernel olein-cured oil (35°C)
11. Fatty acid monoglyceride
12. Organic acid monoglyceride
13. Lecithin
14. Sucrose fatty acid ester
15. Casein sodium
16. Sorbitol
17. Thick malt syrup
18. Water
19. Strawberry-enriched juice
20. Coffee (powder)
21. Spices
22. Particle size distribution of fatty spherical particles (number of particles, %); 0.2 μm or smaller; 0.3 μm or smaller; 0.4 μm or smaller
23. Overrun
24. Mechanical resistance
25. Overrun
26. Mechanical resistance
27. Overrun
28. Mechanical resistance
29. Overrun
30. Mechanical resistance
[19th row from 3rd column]
31. Good
32. Good

[21st row from 3rd column]

33. Good
34. Good
[23rd row from 3rd column]
35. Good
36. Good
[25th row from 3rd column]
37. Good
38. Good

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(Table 4)

			配合量 (重量%)	
			実施例8	実施例9
油相部	パーム核オレイン硬化油 (35℃)		30.0	30.0
	脂肪酸モノグリセライド		0.5	0.5
	レシチン		0.2	0.2
	ショ糖脂肪酸エステル		0.5	0.5
水相部	カゼインナトリウム		2.5	2.5
	ソルビトール		43.0	43.0
	水飴		7.6	7.6
	水		14.6	14.5
	牛乳		1.0	1.0
	キサンタンガム		—	0.05
	HMペクチン (DE値7.2%)		—	0.05
	香料		0.1	0.1
ホイップ後	油脂粒子の粒度分布 (容積%)	0.2 μm以下	17	17
		0.3 μm以下	30	30
		0.4 μm以下	42	42
	オーバーラン		230	230
	機械耐性		良好	良好
	離水状態		—	—
10日後	オーバーラン		230	230
	機械耐性		良好	良好
	離水状態		—	—
60日後	オーバーラン		225	225
	機械耐性		良好	良好
	離水状態		±	—
120日後	オーバーラン		225	225
	機械耐性		良好	良好
	離水状態		+	±

離水状態　+：離水有り　±：やや離水有り　—：離水なし

[1st row from left]

1. Amount of mixture (wt%)
[2nd row from left]
2. Application Example 8
3. Application Example 9
[1st column from 3rd row and down]
4. Oil phase part
5. Water phase part
6. After whipping
7. After 10 days
8. After 60 days
9. After 120 days
[2nd column from 3rd row and down]
10. Palm kernel olein-cured oil (35°C)
11. Fatty acid monoglyceride
12. Lecithin
13. Sucrose fatty acid ester
14. Casein sodium
15. Sorbitol
16. Thick malt syrup
17. Water
18. Milk
19. Xanthan gum
20. HM pectin (a DE value of 72%)
21. Spices
22. Particle size distribution of fatty spherical particles (number of particles, %); 0.2 μm or smaller; 0.3 μm or smaller; 0.4 μm or smaller
23. Overrun
24. Mechanical resistance
25. Water separation state
26. Overrun
27. Mechanical resistance
28. Water separation state
29. Overrun
30. Mechanical resistance
31. Water separation state
32. Overrun
33. Mechanical resistance

34. Water Separation state

[19th row from 3rd column]

35. Good

36. Good

[22nd row from 3rd column]

37. Good

38. Good

[25th row from 3rd column]

39. Good

40. Good

[28th row from 3rd column]

41. Good

42. Good

Water separation state: + Existence of water separation, ± Existence of slight water separation, and – No water separation

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(Industrial applicability)

The whipped cream of the present invention has high overrun and can be refrigerated and preserved over a long term.

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Claims

1. A whipped cream, characterized by the fact that fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist.

2. A whipped cream, characterized by the fact that fatty spherical particles with a particle diameter of 0.1 μm or smaller exist at 10% or more.

3. A whipped cream, characterized by the fact that fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist; and fatty spherical particles with a particle diameter of 0.1 μm or smaller exist at 10% or more.

4. The whipped cream of any of Claims 1-3, characterized by the fact that fatty spherical particles with a particle diameter of 1 μm or greater do not substantially exist at a foam interface.

5. A whipped cream, characterized by the fact that when the particle size distribution of fatty particle particles is measured by the following "method for measuring the particle size distribution," 20 vol% or more of said fatty spherical particles is a particle diameter of 0.4 μm or smaller.

<Method for measuring the particle size distribution>

After the whipped cream is dispersed into ion exchange water and undergoes an ultrasonic treatment, it is measured by a Shimadzu laser diffraction type particle size distribution measurer (SALD-1100, made by Shimadzu Corporation).

6. The whipped cream of any of Claims 1-5, characterized by the fact that the overrun is 150 or more.

7. The whipped cream of any of Claims 1-6, characterized by the fact that a palm kernel olein-cured oil is included.

8. The whipped cream of any of Claims 1-7, characterized by the fact that it is refrigerated and preserved.